

Exploring Weather Trends

In this project, I analyzed local and global temperature data and compared the temperature trends where I live, Madrid, Spain, to overall global temperature trends.

First of all, to extract the data from the database, I did the following SQL queries (in the space provided in the Udacity environment):

```
SELECT *  
  
FROM global_data;  
  
SELECT *  
  
FROM city_list;  
  
SELECT *  
  
FROM city_data;
```

Then, I downloaded the results in a CSV file, and open them in Excel. My Excel did not separate them by column so I had to do it manually with the Excel command for that (Text in columns).

I copy and paste the 2 excel column together in one sheet, so I could manipulate and create the plots in one unique sheet.

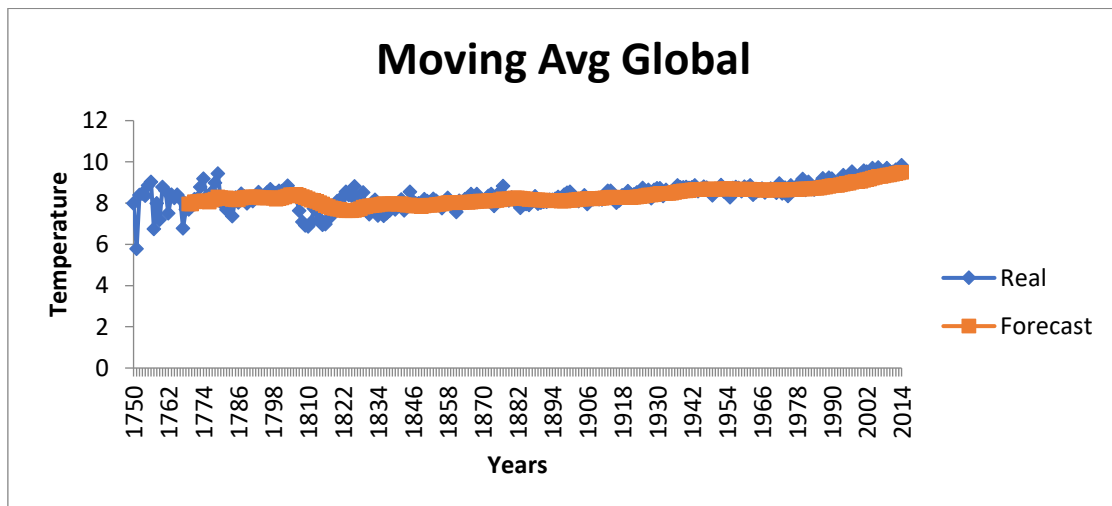
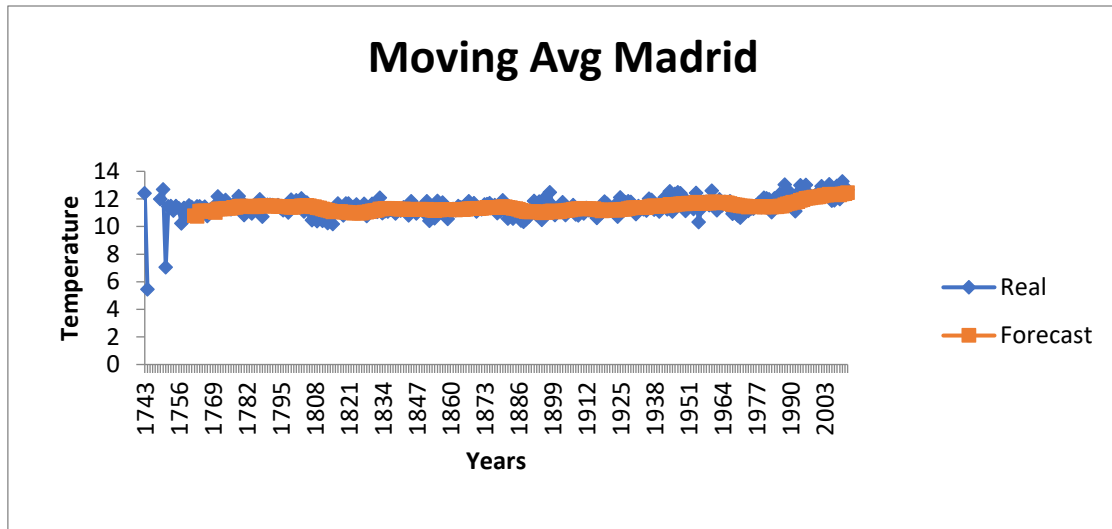
Once I have my data in Excel, I plot the moving average for both, my city (Madrid) and the global temperature. To calculate the Moving Average, I used the Data Analysis in Excel:

1. First, I clicked the Data tab's Data Analysis command button
2. When Excel displayed the Data Analysis dialog box, I selected the Moving Average item from the list and then click OK.
3. I identify the data I wanted to use.
4. I selected an Interval of 20 to display my data
5. I selected a cell to place the average data in my excel worksheet, next to the data I already had.
6. I clicked on Chart option, so a plot was created after closing the dialogue box.

I also had calculated the moving average creating a new column, going to the row number 20, calculating the AVERAGE function from the first 20 rows of the average temperature, both for Madrid and Global, and dragging the formula till the last row. The result was slightly different, but with the same trends. I decided to use the Data Analysis method to show here my results.

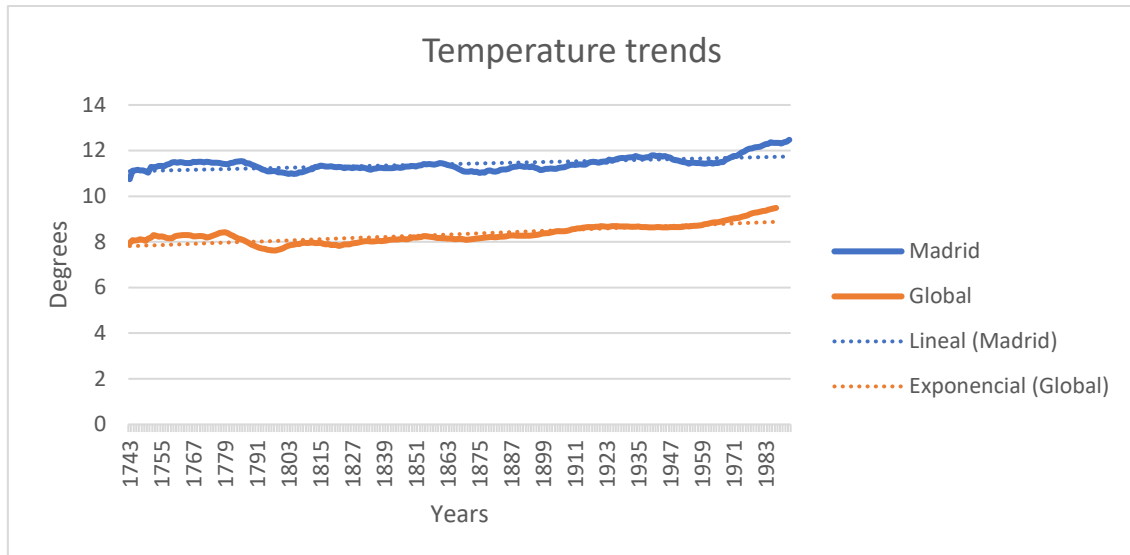
****At the end you can find a comparison between the 2 plots I have obtained with both methods.**

The results were as follow:

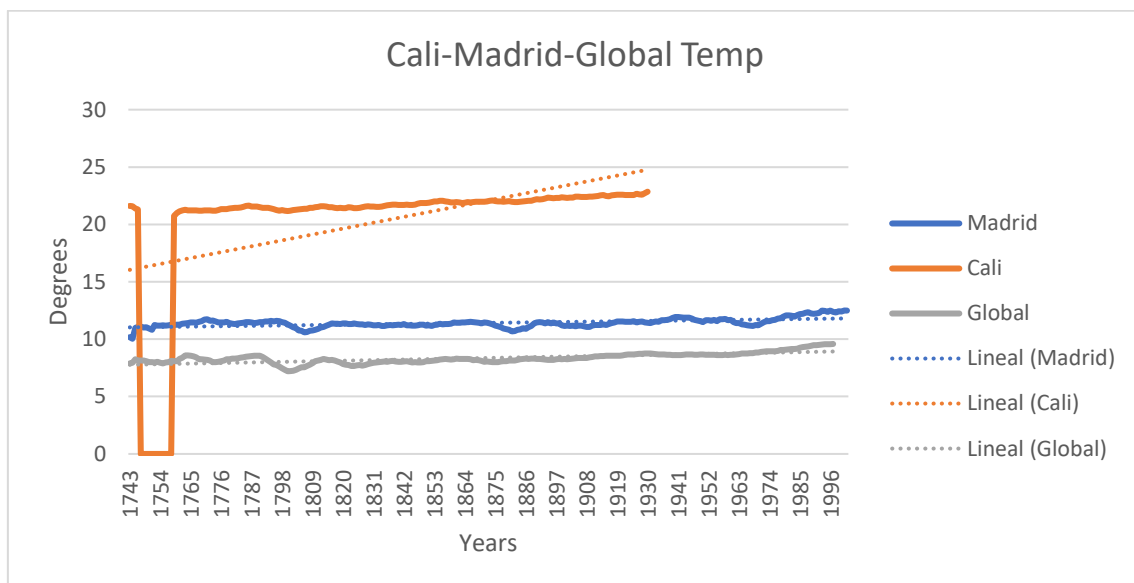


Here I can already see that there is an increasing overall trend in temperature, both in Madrid and Globally, but is not a huge increase. At least in numbers. But if we consider that we are analyzing Temperature, 2 or 3 degrees can suppose a considerable increase.

Finally, in order to analyze the comparison between Madrid and the Global trend, I created a plot with both group of data over the years (the moving average calculated previously) . I grouped the years by 20 when calculating the Moving Average, so it was clearer. The result was as follow:



Just being curious, I also compared the Moving average temperature (what I calculated using the function AVERAGE this time) of Cali city, in Colombia, with Madrid and Global temperature. This is the plot:



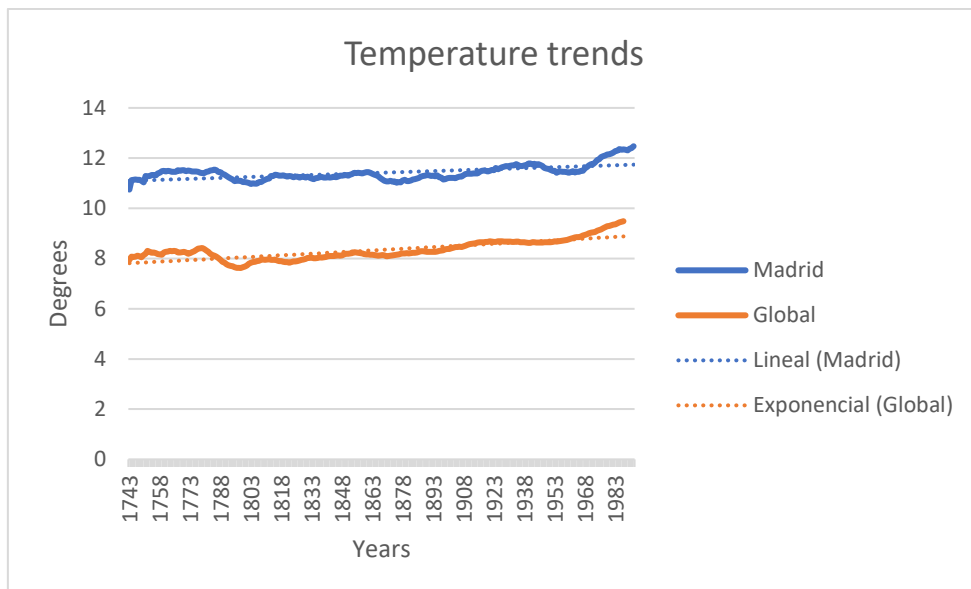
SOME OBSERVATIONS:

- Madrid, my city, is clearly hotter than the Global temperature by approximately 2-3 degrees.
- This difference is consistent over the time. We can see data from 1743 till 2015 grouped by 20 years periods. So, we could estimate the average temperature in Madrid based on the average global temperature, by adding 2.5-3 degrees to the last one.

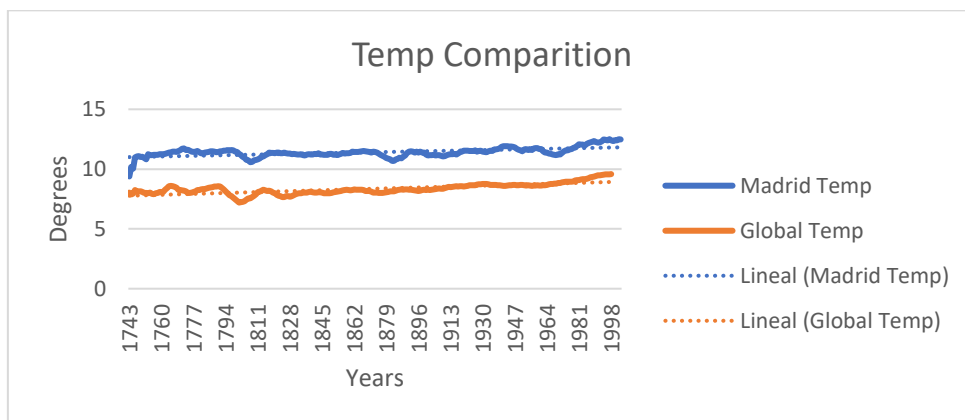
- The trend in Madrid has been an increase in the temperature over the time, of around 2 degrees. The global trend, has also been an increase in the temperature, of 1-2 degrees over the time observed.
- So, we can see that the world seems to be getting hotter. We can also observe that around 1800 there was a general drop down of the temperature, both in global and Madrid. But in general, there is an uptrend in the temperature over the time.
- From the plot comparing Cali, Madrid and Global temperatures, we can see that in Cali, there is also an uptrend over the years, but this time the average temperature is higher than in Madrid and global, by, at least 10 more degrees.

** Comparison between 2 different methods to calculate the Moving Average:

1. Data tab's Data Analysis command button. The resulting plot is:



2. Average Function from the previous 20 days:



Example of some of the averages that are slightly different:

MA using AVERAGE function	MA using Data Tab
11.244	10.74625
11.176	11.1225
11.173	11.13529412
11.204	11.15277778
11.188	11.13263158
11.199	11.1375
11.252	11.091
11.24	11.034